THE DESIGN OF HEAT EXTRACTION SYSTEM FOR SALINITY GRADIENT OF SOLAR POND

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JULY 2020

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ACKNOWLEDGEMENT

First and foremost, all praises to Allah, the Almighty, for all His blessing throughout my research so that I could complete my research until the end. Next, I would like to give the gratitude to my supervisor, Dr. Yusli bin Yaakob, who has sacrifice his time, effort and energy to guide and encourage me with everything he could throughout all the processes of completing this dissertation, if not, this dissertation could never be fulfilled and I could make it until the end.

Other than that, I am so grateful for my family especially my parent and siblings that have put their trusts and believe in me for completing this dissertation and giving me so much encouragement to finish up my writing from the very start until the very last moment. Besides, I am also very thankful to have Amir Harith who has been my partner up and down during the whole process to complete this project.

Finally, I would like to express my gratitude to all the wonderful individuals that have been with me throughout this whole process of completing my research. This is for my friend which is Anas and my housemates who have really supported me when things start to get tough. They are the persons who have given me a bunch of advices and encouragement either physically or mentally so that I could fulfilled my research completely. All your kindness and love towards me will forever be in my memories. For those who were indirectly contributed in this research, your kindness means a lot to me. Thank you very much.

ABSTRACT

In this study, a simple helical type heat exchanger will be designed and analyse to extract heat from the salinity gradient solar pond (SGSP) at UiTM Cawangan Pulau Pinang. This study will show the performance result of heat extraction system in the salinity gradient solar pond with two different design which are Bottom Heat Exchanger (BHE) and Lateral Heat Exchanger (LHE). The main objective of this project is to design and analyse theoretically the performance of heat exchanger in the salinity gradient solar pond. The CATIA software is used to design the heat exchanger to suit the physical condition of constructed SGSP. The type of pipe material for heat exchanger is polyethene. The diameter of the pipe that use was 0.016m with different length for each design. For BHE, the length of the pipe is 12.825 m while the length of pipe for LHE is 28.31m..The effect of parameters such as the available heat in the body of water as well as the mass flow rate of the working fluids were analysed. The temperature of water outlet, the efficiency of both heat exchangers and the rate of heat extraction were the targeted output from this study for both type of heat exchangers. The expected result from this project study is Lateral Heat Exchanger which extracts the available heat in NCZ and LCZ simultaneously has higher efficiency of heat extraction compare to Bottom Heat Exchanger which extracts heat from LCZ only